ENCLOSURE 2

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

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Licensee:	Wolf Creek Nuclear Operating Corporation
Facility:	Wolf Creek Generating Station
Location:	1550 Oxen Lane, NE Burlington, Kansas
Dates:	April 20-24, with inoffice inspection until June XXX, 1998
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ATTACHMENT: Supplemental Information

EXECUTIVE SUMMARY

Wolf Creek Generating Station
NRC Inspection Report 50-482/98-05

Operations

- Licensed operators' knowledge of their responsibilities for Maintenance Rule program implementation was acceptable. The shift supervisors demonstrated a good knowledge of their responsibility in the recording of inoperable equipment and appropriate times in the equipment out-of-service log, control room logbook, and shift supervisor logbook (Section O4.1).

Maintenance

- The licensee's program scoping, in general, was adequate and met the intent of the Maintenance Rule. Pursuant to Section VII.B.1 of the NRC Enforcement Policy, a noncited violation of 10 CFR 50.65(b) requirements was identified for the licensee's identification of the failure to include three functions (auxiliary feedwater flow for a faulted steam generator, isolation between Class/nonClass 125 volt dc power, and reactor coolant system pressure limit following anticipated trip without scram) in the program scope. Two NRC-identified examples of failure to scope applicable functions (essential communications and mitigation of a radioactive release through the turbine building drain system) into the program were identified as a violation of 10 CFR 50.65(b) requirements (Section M1.1).

- The licensee's approach to performing safety significance determination of structures, systems, and components for the Maintenance Rule program was considered to be a weakness due to their use of three poor practices. Downgrading the safety significance of structures, systems, and components that (a) were in cut sets less than 0.1 percent of the total core damage frequency (i.e., structures, systems, and components in cutsets) cumulatively accounting for 62 percent of the core damage frequency considered risk significant and (b) did not meet two or more of the performance measures was a poor practice. Also, the use of old data for the probability risk assessment quantification was a poor practice. In addition, the use of generic instead of plant-specific data for this purpose was a poor practice (Section M1.2).

- The process and procedures for the expert panel were acceptable; however, the panel's decision to allow the modifications to the suggested NUMARC 93-01 safety significance determination methodology was nonconservative (Section M1.2).

- The performance measures determination process was appropriate. The licensee generally based unavailability and reliability performance measures appropriately on the assumptions in the probabilistic risk assessment. The licensee had performed sensitivity analyses for both the unavailability and reliability performance measures. The sensitivity analyses acceptability supported the performance measures (Section M1.2).

- The licensee's guidance for performing a Maintenance Rule program periodic evaluation was adequate. However, the failure to perform a periodic assessment for the interval of February 1996 to May 1998 was a violation of 10 CFR 50.65(a)(3), which requires a periodic evaluation at least every refueling cycle (Section M1.3).

- The licensee's approach to balancing reliability and unavailability was acceptable (Section M1.4).

- The licensee's process for assessing plant risk resulting from equipment out-of-service in Mode 1 was a strength. The licensee's use of the safety monitor to requantify the probabilistic risk assessment model for certain configurations and produce risk profiles for a work week was beneficial. The process used by the licensee for risk assessments during outages was acceptable (Section M1.5).

- Generally, the licensee's programmatic monitoring of performance measures and goals was appropriate. However, a violation of 10 CFR 50.65(a)(2) was identified for the licensee's failure to identify maintenance preventable functional failures associated with the containment isolation system and the main steam system. These failures would have impacted the licensee's monitoring had the failures been identified earlier as performance measures that had been exceeded (Section M1.6).

- A violation of 10 CFR 50.65(a)(2) was identified for the licensee's failure to establish performance measures that were sufficient to demonstrate that the performance of the emergency diesel generator, excore neutron monitoring, and process radiation monitoring systems were effectively controlled by the licensee's preventive maintenance efforts. Pursuant to Section VII.B.1 of the NRC Enforcement Policy, a noncited violation of 10 CFR 50.65(a)(2) requirements was identified for the licensee's identification of the failure to initially establish appropriate performance measures for monitoring the containment isolation function (Section M1.6).

- The licensee's program for monitoring the condition of structures was appropriate, but in need of minor procedural clarification (Section M1.6).

- With the exception of excessive packing leakage observed on the "A" circulating water pump, in general, the visible material condition of the plant equipment and accessible portions of systems was good (Section M2).

- Some of the licensee program procedures were in conflict and not well integrated, which had resulted in minor inconsistencies in program implementation performance. The Maintenance Rule program data base did not yield consistent data when queried by the licensee staff (Section M3).

- While some early assessments had significant findings, the more recent audit findings provided the licensee with current information on important deficiencies in the program. The self-assessment and audit scopes were appropriate, and the findings provided meaningful feedback to management (Section M7).

Engineering

- All groups of engineering personnel with Maintenance Rule program responsibilities were sufficiently trained and experienced to carry out those responsibilities (Section E4.1).

Report Details

Summary of Plant Status

During the inspection week, the Wolf Creek facility operated at or near full power.

Background

Following the onsite portion of the inspection, the licensee provided additional information in regard to some of the inspection team's findings. This information, dated May 29, 1998, addressed the potential violations identified by the team regarding adequate monitoring of the main steam system and the failure to perform a periodic program evaluation.

I. Operations

O4 Operator Knowledge and Performance

O4.1 Operator Knowledge of the Maintenance Rule

a. Inspection Scope (62706)

Team inspectors interviewed a sample of licensed plant operators to determine if they were familiar with the general requirements of the Maintenance Rule, aware of associated probabilistic risk assessment (PRA) insights, and understood their particular duties and responsibilities for Maintenance Rule program implementation.

b. Observations and Findings

The team interviewed four licensed senior reactor operators and found them to have a practical working knowledge of the licensee's Maintenance Rule implementing program. The interviewed operators had a good knowledge on how to identify structures, systems, or components (SSCs) that were scoped in the Maintenance Rule, those SSCs that were risk significant, and those SSCs that were being monitored in Category (a)(1). The operators indicated that their responsibilities included the following.

- Evaluating plant configurations to determine the impact on risk when removing SSCs from service

- Minimizing the unavailability of SSCs when tagging equipment out-of-service for maintenance

- Logging SSCs out-of-service and in-service times in the equipment out-of-service logbook, control room logbook, and shift supervisor logbook

The interviewed operators stated that training had been provided on the Maintenance Rule and on the Wolf Creek PRA. Operator knowledge of PRA appeared to be limited with the shift supervisors having a better understanding of PRA than the supervising operators. Training records were also reviewed by the team, and the training material contained a limited amount of general PRA concepts. The training material primarily emphasized event-based accident sequences. Although the PRA training was limited, the operators had sufficient knowledge of PRA to fulfill their responsibilities and duties associated with the Maintenance Rule implementation.

c. Conclusions

Licensed operators' knowledge of their responsibilities for Maintenance Rule program implementation was acceptable. The shift supervisors demonstrated a strong knowledge of their responsibility in the recording of equipment operable and inoperable times in the equipment out-of-service logbook, control room logbook, and shift supervisor logbook.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Scope of the System, Structure, and Component Functions Included Within the Maintenance Rule

a. Inspection Scope (62706)

The team reviewed the licensee procedure for initial scoping, the Updated Final Safety Analysis Report, and emergency operating procedures (EOPs). The team developed an independent list of SSC functions that they determined should have been included in the scope of the licensee's Maintenance Rule program in accordance with the scoping criteria in 10 CFR 50.65(b). During the onsite review, the inspectors used this list to determine if the licensee had adequately identified the SSC functions to be included in the Maintenance Rule program.

b. Observations and Findings

The licensee's program required identification of detailed functions performed by SSCs and subsequent placement of applicable functions in the program scope. According to Procedure AI 23M-002, "Maintenance Rule SSC Scoping Method," Revision 2, Section 6.0, the Maintenance Rule coordinator (in conjunction with the individual system or responsible engineers) was responsible for developing a list of SSC functions for all plant systems. The list of functions was reviewed against the criteria of 10 CFR 50.65(b) to determine a proposed list of those functions to be included in the program scope. At that point, the expert panel was responsible for reviewing and approving the functions to be monitored by the program.

The inspectors reviewed the licensee's program scoping changes implemented since July 10, 1996. The only functions that had been added to the scope were those associated with structures. Since NRC-endorsed industry and regulatory guidance related to the monitoring of structures was not available until the Spring of 1997, and the licensee placed the proper structures in scope within 6 months of receipt of the guidance, the inspectors had no concerns about these late function additions to the program scope.

The inspectors identified three SSC functions that met the scoping criteria, but were not listed in the program scope.

AL-5 Limit flow of auxiliary feedwater to a faulted steam generator during accident conditions.

FB-3 Electrical isolation between Class and nonClass 125 volt dc power.

SS-1 Ensure reactor coolant system pressure remains below limiting conditions by initiating turbine trip and auxiliary feedwater on anticipated trip without scram mitigation system circuitry actuation.

Licensee representatives agreed that the functions should be in scope and then provided a proposed scoping list indicating they intended to place the functions in scope. The proposed scoping additions had been identified on March 27, 1998, and scheduled for review and approval at the next expert panel meeting. The failure to include the above functions in scope on July 10, 1996, was considered a violation of the requirements of 10 CFR 50.65(b) (50-482/9805-01). This licensee-identified and corrected violation is being treated as a noncited violation consistent with Section VII.B.1 of the NRC Enforcement Policy.

The licensee's program scope did not include the public address and interior communications system (Gaitronics). In response to the team's questions about necessary communication during implementation of the EOPs, licensee representatives stated that essential communications would be performed using hand-held radios. The inspectors determined that two procedures (control room evacuation and loss of all ac power) required the use of radios. However, there was no management policy or general procedure mandating the use of radios to execute the EOPs. Additionally, the radios used to provide the essential functions were not in the scope of the licensee's program.

The team determined that the failure to include the function of essential communications during EOP implementation was an example of a violation of 10 CFR 50.65(b)(2) (50-482/9805-02).

From discussions with licensee personnel, the inspectors learned that due to facility design, a potential existed to collect radioactive liquid in the turbine building drainage system. This drainage system provided two flow paths to the facility heat sink reservoir.

One path drained directly and the other through an oily waste separation system. These paths contained Process Radiation Monitors HFRT-45 and LERT-59. The monitors provided alarm and automatic isolation of the flow paths in the event of increasing radioactivity in the flowpath liquid. The function provided by these monitors to mitigate a release of radioactive liquid was not in the scope of the licensee's program.

The team determined that the failure to include the function for mitigation of a radioactive release through the turbine building drain system was a second example of a violation of 10 CFR 50.65(b)(2) (50-482/9805-02).

c. Conclusions

The licensee's program scoping, in general, was adequate and met the intent of the Maintenance Rule. Pursuant to Section VII.B.1 of the NRC Enforcement Policy, a noncited violation of 10 CFR 50.65(b) requirements was identified for the failure to include three functions (auxiliary feedwater flow for a faulted steam generator, isolation between Class/nonClass 125 volt dc power, and reactor coolant system pressure limit following anticipated trip without scram) in the program scope. Two examples of failure to scope applicable functions (essential communications and mitigation of a radioactive release through the turbine building drain system) into the program were identified as a violation of 10 CFR 50.65(b)(2) requirements.

M1.2 Safety or Risk Determination

a. Inspection Scope (62706)

The team reviewed the methods that the licensee established for making required safety determinations. The team also reviewed the safety determinations that were made for the systems that were reviewed in detail during the inspection. In addition, the validity of the SSC performance measures and the expert panel performance were assessed.

b. Observations and Findings

b.1 Safety or Risk Determination Methodology

The licensee's process for establishing the risk significance of SSCs within the scope of the Maintenance Rule was briefly documented in Procedure AP 23M-001, "WCGS Maintenance Rule Program," Revision 1. The team determined that this document did not explicitly describe the process of determining risk significance. The team was able to determine the full process of risk significance determination through interviews with the expert panel and the PRA personnel.

The licensee used a process similar to the guidance suggested in NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Revision 2, for the identification of high-safety significant SSCs modeled in the licensee's PRA. The licensee used the quantitative performance measures of risk reduction worth (RRW) greater than 0.5 percent, risk achievement worth (RAW) greater than 2.00, and 90 percent core damage frequency (CDF) to identify an initial list of high-safety significant SSCs from the PRA. An SSC was initially considered to be high-safety significant if any one of the performance measure criteria had been met. The licensee then performed two further evaluations and downgraded SSCs to low-safety significant if the cut set value containing an identified SSC had been less than 0.1 percent of the total CDF of if two or more of the performance measures had not been met.

The expert panel was then presented with the list of low-safety significant and downgraded SSCs from the PRA to make the final risk significant determination. The expert panel considered the particular functions of all SSCs, both those SSCs modeled in the PRA and not modeled in the PRA, for its final risk determination. A total of 23 systems was considered to be high-safety significant by the expert panel.

The team reviewed the Wolf Creek PRA application in risk significance determination for the Maintenance Rule program. The Wolf Creek PRA was a linked event tree and fault tree model, which had been developed and quantified with the Westinghouse GRAFTER and WLINK codes. The total CDF was 4.2E-5 per year and was based on the top 10,000 cut sets, which corresponded to a truncation level of approximately 1.2E-10. The licensee's approach to truncation with respect to the risk significance determination was acceptable.

The team noted a weakness in the licensee's process for risk significance determination due to poor practices. Specifically, the use of a PRA model with older data was a poor practice. The current PRA was the model used for the 1992 individual plant examination submittal. The NRC had requested additional information that led to modifications in the human reliability analysis and common cause failure values. The latest model quantification was approved in December 1996, and the new CDF was 6.3E-5 with a truncation of 1.0E-10. Changes in the human reliability analysis and common cause failure values had caused a change in the CDF, and affected the risk ranking results.

A second poor practice the team identified was the use of the generic data for the PRA quantification. The data used in the PRA was primarily generic data that had been collected prior to 1990. Very limited plant-specific data had been used to quantify the PRA. Use of updated plant-specific data for basic event values could potentially identify additional high-safety significant SSCs. The licensee staff indicated that a large effort was necessary to respond to the NRC request for additional information and updating the software tools used to quantify the PRA model. The licensee staff also had indicated that the PRA model has been updated with the Scientech/NUS safety monitor code, which would eventually allow evaluations of plant Modes 1 through 6 and spent fuel cooling. The licensee staff provided a schedule indicating that PRA model updating with current plant-specific data was planned.

A third poor practice was the licensee's use of exceptions to the suggested NUMARC 93-01 risk significant performance measure criteria. The exception of using a cut off value of 0.1 percent of the total CDF was considered nonconservative since this criterion basically corresponded to only the top 128 cut sets (out of 10,000) and the 62 percent CDF level. This exception may have eliminated SSCs that should be considered high-safety significant, and it may have also eliminated SSCs that actually have significant RAW values. Another exception of an SSC having to meet two or more of the performance measure criteria was also considered nonconservative, since these criteria may potentially eliminate an SSC that has a significant RRW, RAW, or 90 percent CDF contribution due to just one of the performance measure criteria. The licensee's use of the exceptions was a poor practice because without the exceptions, approximately 11 additional SSCs could have been considered for high-safety significant ranking. The licensee's staff did not respond to this particular team observation, but representatives stated that they intended to evaluate the effectiveness of the current risk ranking methodology.

b.2 Performance Measures

The team reviewed performance measures to determine if the licensee had adequately set performance measures under Category (a)(2) of the Maintenance Rule consistent with the assumptions used to establish the safety significance. Section 9.3.2 of NUMARC 93-01 recommends that risk significant SSC performance measures be set to assure that the availability and reliability assumptions used in the risk determining analysis (i.e., PRA) were maintained. The team reviewed the licensee's process for determining the performance measures documented in Procedures AP 23M-001, Revision 1, and AI 23M-002, "WCGS Maintenance Rule SSC Scoping Method," Revision 2. The performance measures had been established using the PRA, historical data, and industry experience, when applicable.

For the unavailability performance measures, the licensee established them based on the unavailability assumptions used in the PRA. A sensitivity analysis was performed for the estimated Maintenance Rule unavailability performance measures and the sensitivity analysis indicated approximately a 22 percent increase in the CDF. The Electric Power Research Institute (EPRI) "PSA Applications Guide" indicated that this permanent increase in CDF lies in the region of "further evaluation required." The licensee's staff provided further evaluation indicating that the 22 percent increase was a conservative overestimate because assuming all SSCs were continuously maintained at their performance measure limit was neither expected nor intended.

For the reliability performance measures, the licensee used the EPRI methodology outlined in Technical Bulletins 96-11-01, "Monitoring Reliability for the Maintenance Rule," (November 1996) and 97-3-01, "Monitoring Reliability for the Maintenance Rule - Failures to Run," (March 1997). The licensee used the upper 90 percent confidence level for setting the reliability performance measures. A sensitivity analysis been performed for those SSCs with a reliability performance measure set above the upper 90 percent confidence level. Although the reliability sensitivity analysis had not been approved as final, the analysis adequately assessed the reliability performance measures.

b.3 Expert Panel Observations

The team reviewed the licensee's process and procedures for establishing the expert panel and noted the panel was established in accordance with guidance from NUMARC 93-01. The panel consisted of personnel from maintenance, operations, integrated plant scheduling, system engineering, PRA, nuclear safety engineering, civil engineering, and support engineering. The Maintenance Rule coordinator served as the expert panel chairman.

The expert panel duties and responsibilities were covered in Procedure AI 23M-003, "Maintenance Rule Expert Panel Duties and Responsibilities," Revision 1. The expert panel's responsibilities included final approval authority for systems scoped under the Maintenance Rule, changes in the Maintenance Rule functions, which could affect scoping or risk significance, changes in risk significant systems, including risk ranking, changes in performance measures, disposition of Categories (a)1 and (a)2 SSCs, and any significant changes to the Maintenance Rule program.

The team interviewed the expert panel members. The team noted that the expert panel had received some training on PRA. Expert panel members indicated that their particular area of expertise supplemented the limitations in the PRA model. The expert panel members indicated that they had an adequate knowledge of their responsibilities with respect to the Maintenance Rule program implementation.

The team determined that the expert panel decision to allow modification to the safety-significance determination process was nonconservative. This was because the practices of using a CDF cut off and exceeding two performance measure criteria resulted in fewer SCCs being categorized as high-safety significant.

c. <u>Conclusions</u>

The licensee's approach to performing safety significance determination of SSCs for the Maintenance Rule program was considered to be a weakness due to their use of three poor practices. Downgrading the safety significance of SSCs that were in cut sets less than 0.1 percent of the total CDF (i.e., SSCs in cut sets cumulatively accounting for 62 percent of the CDF considered risk significant) and SSCs that did not meet two or more of the performance measure criteria was a poor practice. Also, the use of old data for the PRA quantification was a poor practice. In addition, the use of generic instead of plant-specific data for this was also a poor practice.

The performance measures determination process was appropriate. The licensee generally based unavailability and reliability performance measures appropriately on the assumptions in the PRA. The licensee had performed sensitivity analyses for both the unavailability and reliability performance measures. The sensitivity analyses acceptably supported the performance measures.

The team concluded that the process and procedures for the expert panel were acceptable. However, the panel's decision to allow modifications to the suggested NUMARC 93-01 safety significance determination methodology was nonconservative.

M1.3 Periodic Evaluation

a. Inspection Scope (62706)

The team reviewed the licensee's guidance for performing a periodic program evaluation to meet the requirements of 10 CFR 50.65(a)(3).

b. Observations and Findings

Paragraph (a)(3) of the Maintenance Rule requires that performance and condition monitoring activities, associated goals, and preventive maintenance activities be evaluated, taking into account where practical, industry wide operating experience. This evaluation was required to be performed at least one time during each refueling cycle, not to exceed 24 months between evaluations.

The licensee's program addressed requirements for periodic evaluations, as stipulated by the Maintenance Rule. The team noted that program requirements for addressing a periodic evaluation were found in Procedure AP 23M-001. The procedure also stated that the periodic assessment could be performed more frequently than the refueling cycle (e.g., on an annual basis).

The team also noted that the licensee's program allowed requirements for performing the periodic assessment to be satisfied through the use of ongoing assessments combined with a higher level summary assessment performed at least once per refueling cycle not to exceed 24 months between summary evaluations.

The team reviewed the following Maintenance Rule quarterly reports:

- Wolf Creek Generating Station Maintenance Rule Management Report for 2nd Quarter 1996
- Maintenance Rule Report - Third Quarter 1997
- Maintenance Rule Quarterly Report - Fourth Quarter 1997

The team recognized that the licensee's quarterly reports were elective; however, due to the number of missing quarterly reports (3rd and 4th quarter of 1996, and 1st and 2nd quarter of 1997) the team was unable to give credit for them, in the aggregate, for being equivalent to the periodic evaluation required by Section (a)(3) of the Maintenance Rule. Furthermore, the latest revision to Procedure AI 23M-004, "Maintenance Rule SSC Monitoring," Revision 1, removed the requirement to produce quarterly reports.

The procedure allowed the performance of the periodic assessment at any time during the refueling cycle as long as it was performed at least one time during the refueling cycle and the interval between assessments did not exceed 24 months. The team found that the licensee staff understood that the purpose of the periodic evaluation was to assess various activities associated with the Maintenance Rule program to assure an effective maintenance program and to identify necessary adjustments to that program.

The program procedural requirements satisfactorily bounded the time frames to meet the intent of the Maintenance Rule for performing a periodic evaluation. The team also determined that the licensee's last two refueling outages occurred in February 1996 and in October/November of 1997, approximately 18 months apart. The NRC expectation is that the periodic evaluation would have been performed in a reasonable time period not to exceed 90 days, after the last refueling cycle. Although a periodic assessment was planned for May 1998, this planned action did not meet the regulatory intent of 10 CFR 50.65(a)(3), which requires performance of a periodic evaluation at least every refueling cycle. Failure to perform a periodic evaluation was identified as a violation (50-482/9805-03).

The licensee submitted additional information regarding this issue. The information offered a different interpretation of the regulation, based on the permitted maximum time of 24 months between evaluations allowed by the Maintenance Rule. The licensee also pointed out that an evaluation had been planned in January 1998, following the completion of the previous outage on December 1, 1997. However, the evaluation had been deferred twice. The inspection team's position was that an evaluation should be completed within 90 days of an outage, and the 24 months were for those licensee's undergoing extended outages.

c. Conclusions

The licensee's guidance for performing a Maintenance Rule program periodic evaluation was adequate. However, the failure to perform a periodic assessment for the interval of February 1996 to April 1998 was a violation of 10 CFR 50.65(a)(3), which requires a periodic evaluation at least every refueling cycle.

M1.4 Balancing Reliability and Availability

a. Inspection Scope (62706)

The team assessed the licensee's methodology to assure that the objective of preventing failures through the performance of preventive maintenance is appropriately balanced against the objective of minimizing unavailability due to monitoring or preventive maintenance. The team reviewed the plans and procedures that the licensee had established to ensure this evaluation was completed, and discussed the procedures with the licensee's Maintenance Rule coordinator and system engineers who were responsible for performing these evaluations.

b. Observations and Findings

The requirements for balancing and monitoring availability and reliability were contained in the Procedure AP 23M-001; Procedure AI 23-004, "Maintenance Rule SSC Performance Monitoring," Revision 1, and Procedure AI 23C-001, "Reliability Centered Maintenance," Revision 2.

The licensee's approach involved monitoring of Maintenance Rule scoped SSCs by the responsible system engineers and comparing SSC performance against established performance measures. The licensee's process had involved, in general, an evaluation of actual performance using an 18-month rolling average with approximately 30 day updates and reviews by the responsible engineers. The process considered unavailability and reliability balanced if the performance measures were not exceeded. This methodology was acceptable.

c. Conclusions

The team concluded that the licensee's approach to balancing reliability and unavailability was acceptable.

M1.5 Plant Safety Assessments Before Taking Equipment Out of Service

a. Inspection Scope (62706)

The team reviewed the licensee's procedures and discussed with applicable licensee personnel the process for assessing the change in overall risk associated with the removal of equipment from service due to failure or to support maintenance activities. The team discussed the process with expert panel members, plant operators, PRA engineers, scheduling, outage, and work authority personnel. A sample of plant configuration changes that resulted from schedule changes and equipment failures was identified and then reviewed to evaluate the licensee assessments of the changes in risk that resulted.

b. Observations and Findings

The licensee's process for evaluating plant risk before taking SSCs out of service was documented in Procedure AP 22B-001, "Outage Risk Management," Revision 1, and Procedure AP 22C-003, "Operational Risk Assessment Program," Revision 1.

The Scientech/NUS Safety Monitor computer code had been used by the licensee to provide a risk assessment indicating the changes in CDF due to maintenance or failures of SSCs during power operation (Mode 1). The current PRA model had been modeled with the safety monitor code so that a full model requantification could be performed for each planned configuration during a weekly schedule. For emergent work, the shift supervisor could use an equipment out-of-service matrix available in the control room. If the configuration was not covered by the matrix, shift supervisors were expected to contact the central work authority manager to evaluate the configuration with the safety monitor. The safety monitor provided a full model requantification for the emergent work configuration. Risk profiles indicating the change in CDF and the duration of changed CDF level was available from the safety monitor. The safety monitor risk profile used three color codes to indicate the change in the CDF. Green was low risk, while yellow and red indicated medium and high risk configurations. The licensee's use of the safety monitor to assess and provide an indication of the plant risk when taking equipment out-of-service was considered a strength.

The licensee representative stated that a risk assessment was performed for planned and actual maintenance configurations during shutdown (Modes 5 and 6) by evaluating plant status for six functional areas: decay heat removal, reactor coolant system inventory control, electric power availability, reactivity control, containment and fuel building closure methods, and cold overpressure protection. Based on evaluation of the six functional areas, a condition designator indicating the amount of defense in depth was provided. Condition 1 was normal risk and indicated that both primary and backup means of satisfying a shutdown safety function were available. Condition 2 identified moderate risk indicating a reduction in equipment available for satisfying a shutdown safety function. Condition 3 identified high risk indicating that only a primary or backup means of satisfying a shutdown safety function was available. This method of evaluating plant risk during shutdown modes was acceptable.

The licensee representative stated that a risk assessment of the plant configurations during other modes of operation was primarily based on engineering judgement. The licensee representative stated the intention was to set up the safety monitor to evaluate plant risk when taking equipment out of service during any mode.

During review of the equipment out-of-service logbooks, control room logbooks, and shift supervisor logbooks, the team identified different plant configurations that were discussed with licensee personnel. No configurations were identified that had not been appropriately evaluated by the licensee's program.

c. Conclusions

The team concluded that the licensee's process for assessing plant risk in Mode 1 resulting from equipment out-of-service was a strength. The licensee's use of the safety monitor to requantify the PRA model for certain configurations and produce risk profiles for a work week was beneficial. The process used by the licensee for risk assessments during outages was acceptable.

M1.6 Goal Setting and Monitoring and Preventive Maintenance

a. Inspection Scope (62706)

The team reviewed program documents and records in order to evaluate the process that was in place to establish performance measures, set goals, and monitor under Category (a)(1) to meet goals or to verify that preventive maintenance was effective under Category (a)(2) of the Maintenance Rule. The team also discussed the program with the Maintenance Rule coordinator, expert panel members, responsible engineers, plant operators, and schedulers.

The team reviewed in detail the systems listed below to verify that goals or performance measures were established with safety taken into consideration; that industry-wide operating experience was considered, where practical; that appropriate monitoring and trending were being performed; and that corrective action was taken when a structure, system, or component function failed to meet its goal or performance measures or when a structure, system, or component function experienced a Maintenance Rule/preventable functional failure.

* Auxiliary Feedwater System
Chemical, Volume, and Control System
Circulating Water System
Class 1E 125 Volt DC Power System
Compressed (Instrument) Air System
* Containment Isolation System
Containment Spray System
Emergency Diesel Generator System
Essential Cooling Water System
Floor and Equipment Drain System
Excore Neutron Monitoring System
Main Steam System
* Process Radiation Monitoring System
* Residual Heat Removal System
Structures

(* indicates Category (a)(1) monitoring)

b. Observations and Findings

The team noted that the performance of the systems discussed immediately below was such that the SSCs were being monitored in accordance with 10 CFR 50.65(a)(1) or (a)(2), as appropriate. Performance measures were appropriate in all cases. The team found that appropriate corrective actions had been taken to address the causes of any unacceptable performance. The team did not identify any inadequate goal setting or performance monitoring for the subject systems.

Auxiliary Feedwater System
Chemical and Volume Control System
Circulating Water System
Class 1E 125 Volt DC Power System
Compressed (Instrument) Air System
Containment Spray System
Essential Cooling Water System
Floor and Equipment Drain System
Residual Heat Removal System

Specific comments on other SSCs are given below.

Containment Isolation

About 1 month prior to the inspection, the licensee's organization made significant changes to the performance measures and categorization of the containment isolation function. Prior to the inspection, the function was being monitored under Category (a)(2) against performance measures related to total containment isolation valve leakage. The performance measures were the technical specification leakage limit for 10 CFR Part 50, Appendix J, tested valves and penetrations (Type B & C) of 0.6 L_a, and stroke times. The Technical Specifications define 1.0 L_a as a leak rate of 0.2 percent of containment air weight per day. During the review of industry information, licensee personnel recognized that the performance measures were not adequate to demonstrate the effectiveness of preventive maintenance to assure the functional performance of containment isolation valves.

As a result of this determination, licensee program personnel requested and submitted to the expert panel a request to change the leakage testing performance measures. A resulting new performance measure was one failure of the Appendix J program administrative limit for individual valves. The initial licensee historical assessment revealed that there were about 12 such failures during the previous refueling outage testing; therefore, the containment isolation function was placed in Category (a)(1).

An evaluation to determine the cause, the corrective action, and the appropriate monitoring goals was in progress during the inspection in response to Performance Improvement Request (PIR) 98-0853. The team informed licensee personnel that the new leakage testing performance measure was so restrictive that it was unlikely that the function could ever be returned to Category (a)(2) monitoring. Licensee personnel acknowledged that they understood this observation. The failure to implement performance measures that were adequate to demonstrate the effectiveness of the preventive maintenance program to assure the containment isolation function as of July 10, 1996, was identified as a violation of 10 CFR 50.65(a)(2) (50-482/9805-04). This licensee-identified and corrected violation is being treated as a noncited violation, consistent with Section VII.B.1 of the NRC Enforcement Policy.

During the review of previous corrective action, the team found failures of the licensee's program to identify functional failures of containment isolation valves. Surveillance failures occurred during the performance of stroke time surveillance testing for Essential Service Water Valves EFHVO31 and EFHVO34. These two motor-operated butterfly valves were part of a family of identical containment isolation valves that isolated essential service water to the containment fan cooling units.

Performance Improvement Request 95-1740 reported that in July 1995, Valve EFHV034 failed a surveillance stroke test when it did not completely close in response to a closure demand. Performance Improvement Request 95-2502 reported in a similar manner that in October 1995, Valve EFHV031 failed to completely close. The two PIRs were eventually closed out, and subsumed into PIR 96-2528, which initiated a root cause analysis and developed corrective action. As a result of the root cause determination effort, two similar failures of Valve EFHV034 within a 15-month period were identified. The additional failures were associated with nonsurveillance activities, such as pretest alignment. Although at the time of testing, the valves were not demonstrated capable of performing their Maintenance Rule function, neither of the failures was identified by the licensee's program as a functional failure and, consequently, not evaluated for a maintenance preventable functional failure (MPFF).

The corrective action program identified the cause for all failures of the valves to close to be improperly adjusted torque switches. The implemented corrective action was to revise the maintenance procedure used to adjust the switches. The team identified that at least one repetitive MPFF had occurred to Valve EFHV034 and, possibly, a second repetitive failure occurred to Valve EFHV031. The team could not identify any Maintenance Rule program monitoring performance measures that were in place to monitor and assess containment isolation valve stroke time test failures prior to the recent monitoring measure change.

Procedure AP 23M-001, "WCGS Maintenance Rule Program," Revision 1, Section 6.7.3, required that any SSC be placed a Category (a)(1) for a repetitive MPFF. A repetitive MPFF was defined as a subsequent loss of function that is attributable to the same maintenance-related cause. NUMARC 93-01 guidance indicated that for initial program implementation, repetitive failures that have occurred in the previous two cycles should be considered. Therefore, the containment isolation function should have been placed in Category (a)(1) on July 10, 1996, when the Maintenance Rule went into effect. The containment isolation function performance measures were not adequate to identify and evaluate a degradation of the safety-related containment isolation function. As a result, the licensee's program did not provide a demonstration that the preventive maintenance program would assure containment isolation function performance and, therefore, was a violation of 10 CFR 50.65(a)(2) (50-482/9805-05).

Emergency Diesel Generator System

The emergency diesel generator system was monitored in Category (a)(2) as a high-safety significant standby system. The system performance was being trended by the licensee against performance measures so that adverse trends could be identified and appropriate actions, preventive or corrective, promptly initiated. The team considered the utility's performance monitoring data, when combined with industry operating experience and information from operating logs and records, as useful in analyzing trends and failures in equipment performance and making adjustments to the preventive maintenance program.

The performance measures associated with system reliability were: (1) no more than 3 start/run failures in the last 20 valid demands, (2) no more than 5 start/run failures in the last 50 valid demands, and (3) no more than 8 start/run failures in the last 100 valid demands. The team noted that the reliability performance measures were based on maintaining a reliability of greater than 0.95 and was consistent with the facility's response to the NRC regarding the "Station Blackout Rule." The team also verified that the emergency diesel generator system was meeting the requirements for station blackout rule reliability for the last 20, 50, and 100 starts.

A review of the emergency diesel generator start log data sheets from October 1997 through March 1998 obtained from the Maintenance Rule data base determined that on October 29, 1997, the "B" emergency diesel generator tripped on actuation of the volts/hertz relay. The licensee subsequently determined that the relay was out-of-calibration and that it would not trip the emergency diesel generator during a nontest condition, and classified the start as nonvalid.

The team noted that unsuccessful attempts to start or load-run were not counted as valid demands or failures when they could be attributed to any of the following: (1) any operation of a diesel generator trip that would be bypassed in the emergency operation mode, (2) malfunction of equipment that is not operable during the emergency mode, (3) intentional termination of a test because of alarmed or observed abnormal conditions, (4) component malfunction or operating error that did not prevent the emergency diesel generator from being restarted and brought to load within a few minutes, and (5) a failure to start because a portion of the starting system was disabled for test purposes, if followed by a successful start with the starting system in its normal alignment.

According to the guidance of NUMARC 93-01, a system is required to be evaluated for Category (a)(1) status if any MPFF contributes to exceeding the performance measures or a repetitive functional failure occurs. The team determined that the performance measures for reliability were incapable of monitoring "nonvalid" failures or repetitive failures since there were no performance measures for monitoring those maintenance activities. The team found that the performance measures established for the reliability of the emergency diesel generator were inadequate and would not monitor the effectiveness of maintenance, since all failures were not identified in tracking the effectiveness of maintenance.

The unavailability performance measures were no more than 200 hours per train in 18 months. The NUMARC 93-01 guidance states that to the maximum extent possible both availability and reliability should be used to provide the maximum assurance that high-safety significant SSC performance is being monitored. The definition of unavailability as found in Appendix B of NUMARC 93-01 states that an SSC that is required to be available for automatic operation must be available and respond without human action. The team noted that specific emergency diesel generator surveillances would render a train under test unavailable to perform its automatic function without human action and would require several steps to restore the emergency power function if needed. These surveillance tests included, but were not limited to Surveillance Procedure STSKJ-015A, "Manual/Auto Fast Start, Synchronization & Loading of Emergency D/G NE01," Revision 6.

The team identified several situations dating from September 1997 through March 1998 that failed to account for the unavailability time during emergency diesel generator maintenance and surveillance activities. The team found that the equipment out-of-service log showed an emergency diesel generator inoperable from September 4 through September 6, 1997, due to performing Surveillance Requirements 4.8.1.1.2.g.2(c)2, 4.8.1.1.2.g.3(d), and 4.8.1.1.2.g.4(d), but no evidence of unavailability was documented in the Maintenance Rule data base for the tests. On September 6, 1997, an integrated diesel generator and safeguards actuation test was performed on Train A. The team noted that although approximately 1 hour of inoperability was identified in the equipment out-of-service log to support an integrated actuation test, no unavailability time was accounted for in the Maintenance Rule data base. The team also identified two occasions where unavailability time for performing Surveillance Procedure STSKJ-015A was not accounted for in the Maintenance Rule data base, even though, as part of this surveillance, the auto start feature was disabled and all the cylinder indicator cocks were open.

The team determined that the licensee's approach to determining system unavailability was inconsistent; therefore, inaccurate monitoring information within the Maintenance Rule data base was maintained. The team observed that PIR 98-0178 initiated on January 23, 1998, documented that train function unavailability was inconsistently applied.

The failure to have adequate performance measures to monitor reliability and to track and monitor unavailability due to surveillance testing was identified as a violation of 10 CFR 50.65(a)(2) (50-482/9805-06).

Excore Neutron Monitoring System

The team noted that the excore neutron monitoring system was not modeled in the plant's probabilistic risk assessment and was originally classified as a high-safety significant system, but subsequently reclassified by the expert panel as low-safety significant. The licensee's low-safety determination was based on the system having a nonsignificant contribution to ensure the capability to shut down and maintain the reactor in a safe shutdown condition. The team noted that the excore neutron monitoring system was monitored as a Category (a)(2) system with no performance measures established for monitoring reliability or unavailability. The licensee had determined that the excore neutron monitoring system maintenance activities would be monitored by the established plant level performance measures as follows: (1) no more than three reactor trips in 36 months, (2) no more than four safety system actuations in 18 months, and (3) no more than 3 percent average unplanned capacity loss factor for an 18-month period.

The licensee had established four functions for the excore neutron monitoring system. Since all four were identified as normally operating functions, no standby functions were associated with the excore neutron monitoring system. The team considered the system function which provided signals to the reactor protection system (for overpower or excess reactivity conditions in the core) as a standby function. NUMARC 93-01 specifies that standby systems may only affect a plant level performance measure if they fail to perform in response to an actual demand signal or during testing. The team noted that since transients occur less frequently than testing and most standby failures were observed during testing, plant level measures were not appropriate indicators for measurement of the effectiveness of maintenance on this system. The team noted that the established plant level measures lacked the capability of identifying failures of the system to provide a reactor trip signal on demand. The team identified the failure to have adequate performance measures established to monitor the excore standby functions as an additional example of a violation of 10 CFR 50.65(a)(2) (50-482/9805-06).

<u>Main Steam System</u>

The licensee identified nine main steam system functions, seven of which were safety related, within the scope of the Maintenance Rule. One function was identified as high-safety significant, while the others were considered either normally operating or standby.

The unavailability performance measures established for the high-safety significant function stated that no more than one atmospheric relief valve could be unavailable for more than 200 hours in 18 months. The function was described as the ability to achieve a 50-degree per hour cooldown rate through the atmospheric relief valves or through the condenser steam dump valves. Technical Specification 3.7.1.6 requires that at least three of the four atmospheric relief valves remain operable. The responsible engineer informed the team that the unavailability performance measures were interpreted to allow (during a 18-month period) a single atmospheric relief valve to accumulate more than 200 hours of out-of-service time, while the other three atmospheric relief valves could accumulate up to 200 hours each. He further stated that as long as two atmospheric relief valves were not out of service at the same time, then unavailability was not tracked because the function was not lost. Since August 1993, there have been no unavailable hours accumulated because no more than one atmospheric relief valve had been out of service at any single time. The team considered this methodology to be unacceptable because it did not monitor the performance of the atmospheric relief valves as intended by the Maintenance Rule.

The main steam system functional reliability performance measures were that there would be no more than one failure to respond to demand for each of the safety relief, atmospheric relief, turbine driven auxiliary feedwater pump supply, and/or main steam isolation valves. During the review of the licensee's Maintenance Rule database documentation, the team identified two instances of apparent functional failures associated with the atmospheric relief valves. Licensee personnel had documented the May 5, 1995, failure of Atmospheric Relief Valve ABPV0002 in PIR 95-1215 followed by the April 20, 1996, failure of Atmospheric Relief Valve ABPV0003 in PIR 97-2011. Licensee personnel understood the reliability performance measures to mean that if the specific function was always available, regardless of failures, then the reliability performance measures would not be exceeded. In addition, the responsible engineer understood that it took more than one failure on the same valve to exceed the reliability performance measures. These understandings resulted in a failure to recognize that the reliability performance measures had been exceeded; thus, the failures were not reviewed to determine if goal setting under Category (a)(1) was required. This precluded the licensee's ability to demonstrate that the performance or condition of the atmospheric relief valves had been effectively controlled through the performance of appropriate preventive maintenance and was an example of a violation of 10 CFR 50.65(a)(2) (50-482/9805-05).

Upon being informed by the team of this potential violation, the licensee initiated PIR 98-1218 to address the above issues. The PIR stated that the issue was discussed with the Maintenance Rule Program Coordinator and that the main steam system would be placed in Category (a)(1). The licensee submitted additional information for the team to consider. However, the licensee agreed that performance measures were exceeded and the main steam system should have been classified as Category (a)(1) for initial Maintenance Rule program implementation.

Process Radiation Monitoring System

The licensee identified three radiation monitoring system functions, one of which was safety related, within the scope of the Maintenance Rule. All three functions were designated as normally operating and were considered low-safety significant. The system consisted of 37 radiation monitors, 10 of which were safety related.

The team noted that all of the radiation monitors operated continuously; however, safety-related Function SP1 addressed train actuations of control room ventilation, fuel building, and containment purge isolation when airborne activity exceeded the limits. The team considered these automatic isolations to be standby rather than normally operating functions; thus, performance measures to monitor at the system or train level were needed to provide a basis for determining satisfactory performance. During review of the radiation monitoring system data base, the team noted, with respect to Function SP1, that the licensee had not established reliability performance measures. The failure to have reliability performance measures to demonstrate that preventive maintenance was effective to ensure that system functions would perform as required was a third example of a violation of 10 CFR 50.65(a)(2) (50-482/9805-06).

Regardless of the failure to establish reliability measures for Function SP1, the responsible engineer understood the plant level measures (i.e., reactor trips, unplanned capacity loss, and inadvertent safety actuations), and because of this understanding and the three inadvertent safety actuations that occurred on January 15, February 4, and March 31, 1998, the expert panel placed the radiation monitoring system in Category (a)(1) status on April 13, 1998.

Structures

The structures inspection program was established in Procedure AI 23M-007, "Engineering Structures Monitoring Walkdowns," Revision 0. The program contained the common attributes for the inspection of structures found in most programs. The program established five levels of acceptance criteria or degradation for each attribute. The performance measures conformed to Regulatory Guide 1.160.

The team noted that all structures within the program scope were placed in Category (a)(1) status September 30, 1997, because a structures baseline inspection had not been completed. Scoped structures were returned to Category (a)(2) on December 17, 1997, after the completion of the baseline inspection. The licensee engaged a contractor to perform the structures baseline inspection of 27 in-scope structures in December 1997. The contractor found no major degradation but submitted 52 observations of minor degradations. All inspection findings were reviewed and dispositioned by design engineering.

The team performed field followup inspection of five observations in the structures monitoring program baseline inspection report. The majority of the identified problems were minor in nature and primarily related to documentation. The baseline inspection report and the program procedure did not reflect the inspection of the condensate water storage tank-foundation and the building enclosure. The foundation and building were inspected, during this inspection, after the team identified the omission. Also, the procedure and data base did not reflect the inspection of the onsite transmission towers. Licensee personnel stated that revision of the baseline report would reflect any new observations. A revision of the procedure and data base would reflect the inspection of the transmission towers. Performance Improvement Request 98-1190 was issued to correct this problem.

The team also determined that the guidance for placing a structure in Category (a)(1) lacked clarity. For example, according to the guidance, it was implied that an aggregate of minor degradations could be the cause for placing a structure in Category (a)(1). However, it was not clear as to the quantity, severity, or configuration of minor degradations that would be sufficient cause to put a structure in Category (a)(1). The licensee staff initiated PIR 98-1178 to address this problem.

The apparent lack of timeliness to complete and implement the structures monitoring program was not an issue to the team because industry and regulatory guidance was not available until the Spring of 1997 when Regulatory Guide 1.160 was issued. The team determined that the licensee's Maintenance Rule program for monitoring structures was adequate. The baseline inspection of structures in scope was an appropriate effort with good documentation of findings.

c. <u>Conclusions</u>

Generally the licensee's programmatic monitoring of performance measures and goals was appropriate. However, a violation of 10 CFR 50.65(a)(2) was identified for the licensee's failure to identify MPFFs associated with the containment isolation system and the main steam system. These failures would have impacted the licensee's monitoring had the failures been identified earlier as performance measures were exceeded.

A second violation of 10 CFR 50.65(a)(2) was identified for the licensee's failure to establish performance measures that were sufficient to demonstrate that the performance of the emergency diesel generator, excore neutron monitoring, and process radiation monitoring systems were effectively controlled by the licensee's preventive maintenance efforts. Pursuant to Section VII.B of the NRC Enforcement Policy, a noncited violation of 10 CFR 50.56(a)(2) requirements was identified for the licensee's identification of the failure to initially establish appropriate performance measures for monitoring the containment isolation function.

The licensee's program for monitoring the conditions of structures needed minor procedural clarification, but was appropriate.

M2 Maintenance and Material Condition of Facilities and Equipment

a. <u>Inspection Scope (62706)</u>

In the course of verifying the implementation of the Maintenance Rule program, the team performed inplant walkdowns to examine the material condition of the following systems:

- Auxiliary Feedwater System
- Chemical and Volume Control System
- Circulating Water System
- Essential Service Water System
- Residual Heat Removal System
- Compressed Air System
- Emergency Diesel Generator System
- Circulating Water System
- Class 1E 125 Volt DC Power System
- Containment Spray System

b. Observations and Findings

The material condition of the structures and systems reviewed was generally good in that the equipment was visually free of water, air, and oil leaks; corrosion or rust; and external damage. In addition, supports, insulation, and coatings appeared acceptable. The team generally found that the electrical and instrumentation systems inspected appeared to be free of corroded or dirty contacts and terminals. The team found the associated instrumentation system cabinets to be appropriately locked and controlled with the various equipment spaces being maintained in a clean environment. Plant systems appeared to be well maintained.

One degraded condition, excessive packing leakage of the "A" circulating water pump was identified by the team during a walkdown of the circulating water system. The team estimated the excessive leakage to be several gallons per minute. The team found that corrective action had not been initiated prior to the team's system walkdown. Subsequent to the system walkdown, the team noted that Action Request AR 28541 was initiated on April 21, 1998, to identify the excessive packing leakage.

c. Conclusions

With the exception of excessive packing leakage observed on the "A" circulating water pump, in general, the visible material condition of the plant equipment and accessible portions of systems was good.

M3 Maintenance Procedures and Documentation

a. Inspection Scope (62706)

The team assessed the usability, effectiveness, and integration of the licensee's program procedures. The quality of the program electronic data base, which documented Maintenance Rule activities, was also evaluated.

b. Observations and Findings

The team identified a number of observations related to the licensee's program. There were conflicts within the licensee's Maintenance Rule program procedures and between the program procedures and NUMARC 93-01 guidance. However, none of these issues constituted violations of regulatory requirements.

NUMARC 93-01 and the licensee's procedures provided similar definitions of availability and unavailability. Procedures AP 23M-001 and NUMARC 93-01 stated that an SSC required to be available for automatic operation must be available and respond without human action. However, neither of these documents provided a definition of "functional" in the definitions section, but this term was used in the shift supervisor and control room logs to declare a piece of equipment or system in some state of readiness.

Procedure AI 23M-004, "Maintenance Rule SSC Performance Monitoring," Revision 1, defined availability as the time period that a piece of equipment will be available to perform its specific function if called upon, as a function of the total time that the intended function may be demanded. The procedure further stated that all unavailability due to preventive maintenance, corrective maintenance, and testing should be considered. This procedure also defined functional as the ability of an SSC to perform its Maintenance Rule program scope function(s).

Upon inquiry by the team, licensee personnel did not demonstrate a consistent understanding associated with the definition of the terms available, functional, and unavailable. Using the definition guidance provided in Monitoring Procedure AI 23M-004, it was identified that some responsible engineers, operators, and the integrated plant scheduling personnel considered an SSC available when it was able to perform its function with only minor system manipulation. If so, the equipment was considered to be functional and available. The definition of unavailability in Procedure AI 23M-004 did not state that an SSC must be available for automatic operation and must respond without human action.

The team informed licensee personnel of the conflicts within the Maintenance Rule program procedures regarding the definition of functional and available, and how this affected the identification of the number of unavailability hours. The team found that the licensee had previously identified this issue and had initiated PIR 98-0178 on January 23, 1998, to address the issue.

The team identified occurrences in the tracking and logging of individual equipment failures and unavailabilities. These occurrences were the result of omission of entries for failures or unavailabilities not tracked through the equipment out-of-service log and control room log. Failures of equipment that were not under a time clock (i.e., Technical Specification or administrative) and were not high visibility equipment may not have been captured in the Maintenance Rule program data base. The failure to correctly record individual equipment failures and unavailability hours could result in erroneous SSC classifications. The licensee was aware of this problem and was evaluating the finding in response to PIR 98-0747 issued on March 18, 1998, prior to the inspection.

The team also noted inconsistency in entering information in the PIR data base, which compromised the monitoring and trending performed by many groups including the responsible engineers. To review the performance history of selected systems, the team requested a printout from the PIR data base of PIRs against specific systems issued in the last 2 years. The initial lists of PIRs associated with the team-selected systems were generated by performing a search of the PIR data base using the two-letter system designation. The team noted that the initial list provided for the containment spray system, based on a search using the system designation "EN," identified 18 PIRs that were issued in the last 2 years. The team requested that a second search of the PIR data base be performed using the full system name "containment spray." This search of the PIR data base identified 42 PIRs. The licensee performed a third search of the PIR data base using the words "cntmt spray" and found an additional PIR that was not among the PIRs listed from the previous two searches.

Searches of the PIR data base for auxiliary feedwater, chemical and volume control, residual heat removal, and circulating water systems found similar inconsistencies between the searches performed using the two letter system designation and other search criteria.

After the team requested the additional searches of the PIR data base and the licensee became aware of the team's concern over the inconsistencies associated with the searches, PIR 98-1175 was initiated.

The team noted that the licensee had previously identified and was correcting the procedure integration and out-of-service documentation issues.

c. Conclusions

Some of the licensee program procedures were in conflict and not well integrated, which had resulted in minor inconsistencies in program implementation performance. The Maintenance Rule program data base did not yield consistent data when queried by the licensee staff.

M7 Quality Assurance in Maintenance Activities

M7.1 Licensee Self Assessment

a. Inspection Scope (62706)

The team reviewed a total of six self assessments, audits, and surveillances listed in the attachment that were performed on the licensee's Maintenance Rule program between July 1994 and March 1998.

b. Observations and Findings

The licensee performed several audits to assess the Maintenance Rule program implementation. Self-Assessment Report SEL 95-025 for periodic assessment of the Maintenance Rule implementation effectiveness dated August 1995 indicated that a goal of full implementation of the Maintenance Rule could have been achieved by the end of 1995 and recommended this early implementation. The report noted that this would provide a sufficient implementation period to allow the performance of an audit and periodic evaluation of the implementation phase of the program, before the effective date of the new rule.

The team found additional information in PIRs from early in 1997 indicating that the condition of the Maintenance Rule program was such that it would be difficult to successfully demonstrate compliance to the rule. As part of the corrective action, the licensee planned a self-assessment for December 1997. This self-assessment was delayed due to the refueling outage extension and other work impacts. The self assessment that resulted was effective and thorough, resulting in the identification of substantial discrepancies as delineated below.

The recent audit of March 1998 was performed under contract and consisted of a team of six individuals, two of whom were licensee personnel. A principal finding of the audit concerning interpretation of the guidance of NUMARC 93-01, Section 12, on periodic evaluation was inconsistent with the NRC's position on performing a periodic evaluation of Maintenance Rule activities at least every refueling cycle provided the interval between evaluations does not exceed 24 months. However, the audit was thorough, candid, detailed, and effective in the identification of issues involving program staffing, rescoping efforts, the PRA, performance measures for high-safety significant and standby SSCs, functional failure determinations, identification of MPFFs that occur across system boundaries, use of industry experience, staff training, and program procedural deficiencies. The report concluded that the structural monitoring program was a strength.

c. Conclusions

The team concluded that while some early assessments had significant findings, the recent audit findings provided the licensee with current information on important deficiencies in the program. The self-assessment and audit scopes were appropriate, and the findings provided meaningful feedback to management. In response to the findings, the licensee initiated appropriate corrective actions through their corrective action program PIR process.

M8 Miscellaneous Maintenance Issues

M8.1 (Closed) Inspection Followup Item 50-482/9606-01: Review of the licensee's root cause analysis of the H38 fuel assembly damage. During fuel handling, the welds on a spacer grid had been broken and the spacer grid had become lodged under the adjacent down stream spacer grid. NRC Inspection Report 50-482/97-17 addressed this item and left the item open pending review of questions concerning the material property behavior identified in a performance improvement request. Subsequently, the questions on the material property behavior were resolved, and no safety concerns were identified.

III. Engineering

E4 Engineering Staff Knowledge and Performance

E4.1 Engineer Knowledge of Maintenance Rule

a. Inspection Scope (62706)

During the inspection activities, inspection team members interviewed responsible engineering personnel to assess their understanding of the Maintenance Rule program and associated responsibilities. The team reviewed procedures and documents to determine engineering responsibilities. The team also reviewed the training that had been administered to system engineering personnel.

b. Observations and Findings

The team determined that the engineers had the following responsibilities:

- Reviewing and approving the data used to establish the performance measures for the SSCs within the scope of the Maintenance Rule
- Performing cause analysis, as required by the PIR process
- Participating in the development and approval of goal setting activities
- Developing proposed corrective actions taken to improve SSC performance under their area of cognizance
- Ensuring SSC performance data was evaluated, trended, and reported as required

Generally, engineering personnel were trained sufficiently to implement their assigned Maintenance Rule program responsibilities.

All engineers interviewed were knowledgeable of the systems for which they had responsibility. The interviewed engineers indicated that they had received approximately 4-6 hours of formal training in the Maintenance Rule and PRA. The engineering personnel generally understood the relationship between PRA and the safety functions and performance measures of their respective systems.

The engineers had provided minimal input with respect to the determination of SSC functions, categorization, and performance measures. Most of the interviewed engineers were not familiar with how functions were monitored at plant level. They indicated that this responsibility belonged to the Maintenance Rule coordinator and, with few exceptions, could not provide any specifics.

c. Conclusions

All groups of engineering personnel with Maintenance Rule program responsibilities were sufficiently trained and experienced to carry out those responsibilities.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors discussed the progress of the inspection on a daily basis and presented the inspection results to members of licensee management at the conclusion of the onsite inspection on April 24, 1998. In addition, a supplemental telephonic exit was held on June 30, 1998, to discuss the enforcement findings from the inspection. The licensee management acknowledged the findings presented.

The inspectors asked the licensee staff and management whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Andrews, Licensing
T. Anselmi, Supervisor, Engineering Programs
K. Derakhshandega, Daily Scheduling Superintendent
T. Harris, Supervisor, Licensing
A. Hawley, Maintenance Rule Coordinator
D. Jacobs, Superintendent, Support Engineering
D. Knox, Manager, Maintenance
P. Martin, Central Work Authority
O. Maynard, President, Wolf Creek Nuclear Operating Corporation
B. McKinney, Plant Manager
D. Moseby, Superintendent, Operations
R. Muench, Vice-President, Engineering and Technical Services
D. Neufeld, Outage Superintendent
R. Osterrieder, Supervisor, Safety Analysis
C. Reekie, Licensing
R. Sims, Superintendent, System Engineering
C. Warren, Vice-President, Nuclear Operations

NRC

F. Ringwald, Senior Resident Inspector

INSPECTION PROCEDURES USED

IP 62706	Maintenance Rule

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-482/9805-01	NCV	Failure to include in the program scope three functions
50-482/9805-02	VIO	Failure to include in the program scope functions associated with essential communications and turbine building drain system radioactive release mitigation
50-482/9805-03	VIO	Failure to perform a periodic evaluation

50-482/9805-04	NCV	Failure to demonstrate that the condition of the containment isolation system had been effectively controlled through the performance of appropriate preventive maintenance
50-482/9805-05	VIO	Failure to identify MPFFs of functions associated with containment isolation and main steam systems
50-482/9805-06	VIO	Failure to establish appropriate system or train level performance measures to demonstrate that preventive maintenance was effective to ensure that functions associated with emergency diesel generator, excore neutron monitoring, and process radiation monitoring systems would perform as required

Closed

50-482/9805-01	NCV	Failure to include in the program scope three functions
50-482/9805-04	NCV	Failure to demonstrate that the condition of the containment isolation system had been effectively controlled through the performance of appropriate preventive maintenance
50-482/9606-01	IFI	Followup of root cause analysis of H38 fuel assembly damage

LIST OF PROCEDURES REVIEWED

AP 23M-001	WCGS Maintenance Rule Program, Revision 1
AI 23M-002	Maintenance Rule SSC Scoping Method, Revision 2
AI 23M-003	Maintenance Rule Expert Panel Duties and Responsibilities, Revision 1
AI 23M-004	Maintenance Rule SSC Performance Monitoring, Revision 1
AI 23C-001	Reliability Centered Maintenance (RCM), Revision 2
AP 22B-001	Outage Risk Management, Revision 1
AP 22C-003	Operational Risk Assessment Program, Revision 1
AI 23M-004	Maintenance Rule SSC Performance Monitoring, Revision 1
AI 23M-007	Engineering Structures Monitoring Walkdowns, Revision 0
AP 28A-001	Performance Improvement Request, Revision 9
OFN KJ-032	Local Emergency Diesel Startup, Revision 4
AP 23E-001	Emergency Diesel Generator Reliability Program, Revision 2

STS KJ-015A	Manual/Auto Fast Start, Synchronization & Loading of Emergency D/G NE01, Revision 6

LIST OF DOCUMENTS REVIEWED

Calculation AN-98-025	Evaluation of Maintenance Rule Unavailability Performance Measures on Core Damage Frequency, April 16, 1998
Assessment Plan SEL 94-030	Maintenance Rule Implementation Program, July 26, 1994
Assessment Report SEL 95-025	Periodic Assessment of the Maintenance Rule Implementation Effectiveness
QA Audit Report K15-002 K-448	Maintenance Rule Program and Reliability Centered Maintenance, December 07, 1995
Report No. WNOC-12-21186	Maintenance Rule Self-Assessment Report, Wolf Creek Nuclear Generating Station, March 1998
SSR No. 95-001	NSE Surveillance of Plant Activities "Review of AP 30-220, Operational Risk Assessment Program"
SSR No. 96-014	NSE Surveillance of Plant Activities "Review of Maintenance Rule Program PIRs"
	Letter dated September 29, 1995, relating to NEI site assistance visit
PA 97-0009	Issuance of WCNOC Quality Biennial Audit Schedule, Revision 13
	Plant Evaluation Checklist No. OB 98-0161
	Wolf Creek Generating Station Updated Final Safety Analysis Report
SL-5172	Structural Monitoring Program, dated December 3, 1997
72.56	Evaluation of Maintenance Rule Observations, Revision 0
WCNOC-91-EE	"Essential Service Water System Design Basis Document, Revision 2
SA-90-039	PRA Essential Service Water Systems Notebook, Revision 2
Report IIT 97-002	Failure of 'B' RHR Pump to Start, December 10, 1997
	System Health Indicator, Auxiliary Feedwater System, March 5, 1998

System Health Indicators, Chemical and Volume Control System, March 13, 1998

Containment Spray System Report, First Quarter 1998, Report Number 2

PERFORMANCE IMPROVEMENT REQUESTS

94-1083	96-0015	97-0721	97-3331	98-0747
94-1094	96-0316	97-0747	97-3421	98-0853
94-1336	96-1597	97-0748	97-3576	98-1070
95-0039	96-2528	97-0775	97-3577	98-1135
95-1215	96-2646	97-1775	97-3579	98-1175
95-1740	97-0051	97-1995	97-3587	98-1178
95-2502	97-0171	97-2011	97-3588	98-1190
95-3061	97-0204	97-2304	97-3937	
95-3074	97-0370	97-2661	98-0178	

ACTION REQUEST NUMBERS

05544	12376	13934	20463
05718	12918	20456	20784
11774	13196	20457	25436
12254	13227	20462	25826
12375			

LICENSEE EVENT REPORTS

93-014	94-006	96-007